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ABSTRACT

A Swedish research project dealing with creativity in schools is summarized and discussed. Interest areas include: (1) surveys of opinions about how to promote creativity in schools; (2) classroom observations on creativity-relevant teacher-student interactions; (3) development and try-out of certain Swedish tests for creativity; (4) studies of relations between these tests and various personality variables; and (5) attempts to construct and evaluate potentially creativity-promoting study materials, integrated in the regular school work. One of the main findings was that it is possible to stimulate aspects of creativity by fairly simple means, using specific types of study materials. An annotated bibliography of Swedish studies of creativity is included. (Author/MV)

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EXPLORATIONS IN CREATIVITY

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Explorations in Creativity

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A Swedish research project dealing with creativity in school is summarized and discussed. The interest areas include: (1) surveys of opinions about how to promote creativity in schools; (2) classroom observations on creativity-relevant teacher-student interactions; (3) development and try-out of certain Swedish tests for creativity; (4) studies of relations between these tests and various personality variables; and (5) attempts to construct and evaluate potentially creativity-promoting study materials, integrated in the regular school work. One of the main findings was that it is possible to stimulate aspects of creativity by fairly simple means, using specific types of study materials. Hence, further developmental work focusing on the study materials in basic school subjects, is recommended.

Keywords: Creativity; study materials; teacher-student interactions; test construction; creativity; training program; creativity; school level: comprehensive school.

Background

In the curriculum for the compulsory school in Sweden we find several statements of the following kind: The students should be encouraged and trained to make their own combinations, to draw their own conclusions, to design and create, to experiment and make discoveries. Problem sensitivity, ability in innovative thinking and independent creation are important characteristics, and we hope that school can contribute to the development of these characteristics in the students. A person displaying problem sensitivity, ability in innovative thinking and independent creation is often labelled "creative". To what extent and in what ways can the school stimulate creativity?

Such questions are not easy to answer. At present there is a considerable risk that these important parts of the school's objectives will remain mere verbal gloss and not penetrate to a sufficient de-

gree the practical planning of education, nor be included as an essential component when different types of educational experiments are being evaluated.

One of the reasons for this is probably the fact that measurement techniques within the creativity field are still relatively under-developed (compared to techniques for measuring knowledge and convergent intelligence). In addition, the general directions on method in the curricula and available training materials give the individual teacher very little guidance in these questions. There is a risk that some teachers tend to see tendencies to autonomy primarily as disciplinary problems and creativity sometimes as a lack of interest and inattentiveness in school work. Valuable expressions of autonomous creativity are then more likely to be suppressed than encouraged. A teacher of this kind may in injudicious zeal obstruct important sections of the school's objectives (by creating a climate hostile to creativity, etc.).

In spite of considerably increased research interest in this field during recent decades, the area of creativity is still a relatively virgin area presenting many difficult problems. Therefore, one should naturally not expect that a simple series of pre-determined research operations will easily lead to definite results and final products. A project of this type can aspire to no more than to contribute to augmenting our knowledge within the goal areas mentioned leaving the field a little bit better structured for the next research-and-development team that in their turn will carry the work another series of steps further.

In the present survey we will give some glimpses from a research project on creativity in school, carried out at the Malmö School of Education.

Main aims of the project

The project had three main aims:

- (1) to construct, adapt and try out certain tests for measuring creativity and to study the relation between these tests and variations in age, intelligence and personality variables;
- (2) to explore via teacher opinions and classroom observations

teacher and student behaviors that can potentially influence creativity;

- (3) to design examples of exercise materials aimed at stimulating creativity and to study certain effects of these.

Project structure and personnel

The project comprised a series of sub-studies of varying size, for example, a test-analytical study (18 classes), an observation study (23 classes), and a study material investigation (24 classes).

The author of the present survey article was project leader, but two research assistants were mainly responsible for the concrete project work. The main task of Göran Hansson was to organize and carry out the test studies and the investigations of study materials, while the main task of Anneli Eriksson was to organize and carry out the opinion studies and the observation studies in classrooms. Many other people were involved, for example, three teams of teachers for the development of study materials. An artist, Axel W. Ekelund, contributed illustrations as well as good ideas.

Collecting opinions

In order to find out what "school-experienced persons" (teachers, school leaders, further education consultants, tutors, methodics lecturers) understand by the expression "creative ability" and what they think about the steps that should be taken at school to promote creative behavior, an "open" questionnaire on these topics was drawn up; it was answered by about 300 people. A second, more structured questionnaire was then constructed in order to follow up some of the points of view that emerged. This was focused on educational methods and study materials for encouraging creativity and was answered by about 350 people ("key teachers", with special duties as consultants or planners of inservice teacher training). In order to explore how teachers react to various creativity-related behaviors, about 200 teachers were given a special instrument in which they had to make decisions in a number of hypothetical classroom situations. The results of these related studies were reported by Anneli Eriksson (1970).

The data show, among other things, that there is a relatively good correspondence among the respondents in the judgements on which ways of working in school and which school activities may be of special importance from the point of view of creativity development. It is equally obvious, however, that the teachers express a marked need of more guides and aids: teacher manuals and materials to stimulate student work. The explicitly stated wish for more guides and training materials in combination with a certain consensus on how creativity-stimulating activities should be designed, in principle, gives stimulus and lines of direction for continued developmental work.

Observing teacher-student interactions

The questionnaire data gave some information on teacher and student behaviors as potential influences on creativity. Related to the same problem area were the project's observation studies. One of the main purposes of these studies was to try out an observation schedule, comprising behavior categories which according to creativity theories should be related to creativity (classroom behaviors that would stimulate vs. hold back creativity).

The general structure of the major observation instrument used is illustrated in Box 1. In addition, a rating schedule was used.

The study was carried out in 23 classes in grade 6. Throughout, observations were made by double observers to check on observer consistency. Each class was observed during eight lessons. In addition, the students (about 500) were tested by a battery of creativity tests and other instruments on two occasions (before and after the observations), and the 23 teachers were interviewed.

Among the questions asked in this study were the following: For which sub-areas can the observation system be considered reliable in terms of inter-observer agreement? What is the general classroom picture of creativity-stimulating behavior: Do we find high or low frequencies of behaviors supposed to be creativity-stimulating? Are there relationships between teachers' way of teaching, according to observations, and students' results on creativity tests and students' views on the teaching?

Box 1. General structure of the observation schedule

Main area	Category	Variable
Teacher-student relations	Motivation method	positive motivation negative motivation task-related motivation
	Initiative	teacher initiative student initiative
	Differentiation	differentiation
Teaching structure	Thought processes	reproductive convergent divergent evaluative
	Variation	variation

The observation system is reported in a manual-type report (Eriksson, 1973 a), and the study and its results are presented in two research reports (Eriksson, 1972 a and b).

In general, the results show the observation and rating schedules to be sufficiently reliable for most variables to be useful as a research instrument. The results from the observations also correspond, in principle, with the opinions of the students and the teachers about characteristics of the teaching in the class. Also in this respect the observation schedule can be said to have functioned as desired.

No simple and clear-cut relations between student creativity (as measured by tests) and classroom characteristics (as observed) were found, however. The reasons for this may be many. On both sides (creativity — classroom behavior) the behavior studied is a very limited cut-out from a large and complex totality, which means that expectations as to observable relations should not be high. However, one might also discuss whether the teachers' use of creativity-stimulating thought processes might not be such a small part of the total teaching interaction that even those teachers who in this study were judged to have a relatively "pro-creativity" approach had little chance of observably influencing the creative ability of their students. If such an interpretation is correct, the importance of special training materials is further emphasized.

Anyhow, the skewed distribution of various types of thought processes is worth noting. The following percentages were found:

"reproductive" processes	66.4
"convergent"	24.9
"divergent"	3.9
"evaluative"	4.8

Thus, less than 4% have a divergent orientation, less than 5% an evaluative orientation. Obviously, those processes that usually are judged as potentially important for the development of creativity have a markedly low frequency.

In addition, the lessons were heavily teacher-dominated. Student initiatives only comprised about 8% during an average lesson.

Measuring creativity and related variables in school children

One of the project's sub-studies contained two major sub-tasks: (a) Construction and trying out of some group tests for the measurement of creativity among Swedish school children. (b) Application of the main tests at the same time as batteries of selected personality tests and cognitive instruments in order to get a better idea of the relational fertility of the main variables.

The study was carried out in grades 4, 6 and 8 (with a total of 18 classes). The basic test battery was given to all the classes; in addition, an extended battery of intelligence, flexibility and personality measures was used in grade 8.

The main questions asked were: (1) How do the creativity tests used function as measurement instruments? How do various sub-scores relate to each other? — (2) What kinds of development over age are found? Are there sex differences? — (3) What relationship, if any, are seen between degree of creativity and certain personality characteristics?

The results of this study have been presented in a report by Göran Hansson (1973 b). A Swedish manual for several of the main tests with instructions for scoring etc. has also been prepared (Hansson, 1973 a). A figural creativity test has been presented separately (Eriksson, 1973 b).

Various analyses of the measurement techniques indicated that

the procedure of assessing the same answer on a creativity test from different aspects (a procedure which is very often used, for example, in the well-known Torrance battery) cannot be generally recommended. The fact is that such different aspects of the same test (for example, fluency, flexibility and originality) usually show higher intercorrelations than the same aspect measured over different tests. This is also another way of saying that the creativity responses usually show a considerable variation related to the character of the stimulus task. This should not be surprising *per se*, but it means that tests relying heavily on a single stimulus situation (or on very few stimulus situations) will easily give unreliable information.

The measurement difficulties referred to here can be avoided or at least substantially reduced, but in doing so, we have to accept that a reasonably reliable measurement battery cannot be short and quick. Moreover, we have to face the fact that specific external and internal conditions play an important role in any creative process, which makes attempts to predict creative behavior difficult. Being aware of the difficulties does not mean we should stop trying, however; and the inclusion of certain personality and motivation data may increase the prediction possibilities.

The age development did not show an even quantitative increase, as in many other cognitive measurements. Instead, an improvement of quality was observed: the number of irrelevant responses decreased over the years, whereas the number of high-quality originality answers increased.

Some tendencies to different developments for boys and girls were noted. The boys tended to display more original achievements, while the girls as early as in grade 4 gave significantly more elaborations within their answers.

From the attempts to compare creativity data with personality variables may be mentioned that creativity tended to correlate positively with "access to mental energy" (as measured by a Swedish questionnaire related to the theories of Sjöbring) as well as with "independence" (as rated by teachers), "ego-weakness" (emotional instability), and "sensitivity" (as measured by factors C— and I+ on the HSPQ). — In general, however, the relations between creativity data and personality variables were few and not strong. Such a pattern seems plausible from various points of view,

considering (1) the young age of the sample, (2) the measurement difficulties involved on both sides of the comparison, and (3) the very reasonable theory of a multi-source determination of most creative expressions — an idea that obviously would *not* indicate that high correlations with any specific personality variable would be probable.

Further information on creativity tests and their characteristics is given in other reports from the project (for example, Eriksson, 1972 b; Hansson, 1974 a).

Constructing and trying out educational materials

Special educational materials were constructed, oriented towards students on the middle level of the basic school. These were given a comprehensive experimental evaluation (reported in Hansson, 1974 a). In addition, teacher and student opinions on the materials in use were collected (Björklund, 1974).

In international literature, we find many attempts to study creativity-stimulating material, but several of them display one or more of the following, less desirable characteristics: (a) The material has a content that is totally extraneous in relation to the school subjects (which involves a risk that teachers and students regard these exercises as less important than the other teaching-learning situations). (b) The try-out and evaluation is carried out on groups of persons, onesidedly composed of especially interested people (which obviously diminishes the possibilities of drawing conclusions concerning how the material would function in more normal school situations). (c) Exercises and tests are closely similar to each other, and the tests cover only a narrow range of behavior (which may mean that the effect registered is too specific and perhaps artificial).

In contrast, it was characteristic for the present project's studies that creativity-stimulating exercises were constructed with contents directly taken from the school subjects under study, that a non-selected group of teachers and students was used, and that the possible effects of the exercises were studied over a broad spectrum of potentially relevant aspects.

Thus, exercises designed to promote creativity were constructed

REBUS

A



STORK

-K+



SKO

+JA



REN

-N

STOR - SKO - JA - RE

VILKET ORD BLIR DETTA?



-D+



GOR NU SJALV EN REBUS TILL ORDET STOCKHOLM.

HITTA NU PA EN ALLDELES EGEN REBUS!

B KORSORD BAKLÄNGES

1	A	P	E	L	S	I	N				
	R		6	U	P	P		7	I	T	
9	D	10	U	R		11	O	12	M	A	R
13	E	K	O	R	14	R	E			O	
	N		15	P	E	T	T	16	E	R	
17	N	O	A	K			18	E	N		
	E				19	T	Ö	R	S	21	T
22	R	O	23	S	O	R		24	A	Ö	
			25	Y	R		26	O	M	S	

Här ser du ett korsord, som redan är löst.

Din uppgift blir att försöka hitta på beskrivningar till de redan ifyllda orden. Till vågrätt 1, APELSIN, kan beskrivningen t. ex. vara "sydländsk frukt". Ibland finns det två rader till ett ord och då skall du hitta på två beskrivningar. Till APELSIN hade du då kunnat skriva:

"sydländsk frukt" och
"kan vara både söt och sur"

Vågrätt:

1 _____

6 _____

7 _____

9 _____

11 _____

13 _____

15 _____

17 _____

18 _____

19 _____

22 _____

24 _____

25 _____

26 _____

C

Bättre namn

Mycket ofta är det namnet på en person eller sak, som fångar vår uppmärksamhet och gör oss intresserade. Få se hur bra du är att hitta på namn. Ge två namn åt dessa saker.



a) Vad skulle du vilja kalla en kombination av
sängvärmare och termoskanna?

1. _____

2. _____

b) Vad skulle du vilja kalla ett droppfritt stearinljus, som utformats som
Lennart Hyland?

1. _____

2. _____

c) Vilket namn skulle du vilja ge en smetfri sololja, som också är jättegod
på hamburgare?

1. _____

2. _____

D

TYSTNADENS MAKT

Har du önskat någon gång, att du kunnat "stänga av någon" som pratar för mycket, precis som man stänger av en radio? Skulle man kunna lösa några problem på det sättet? Eller skulle man skapa nya problem i stället?



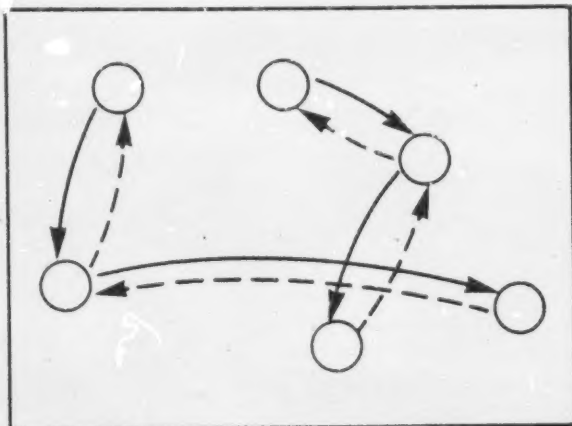
Fundera och skriv ner 5 saker som skulle hända om man hade förmågan att "stänga av" folk.

1. _____
2. _____
3. _____
4. _____
5. _____

E

I bilden nedan har vi ritat ringar samt pilar. $\longrightarrow$ betyder "är dubbelt så stort", $-\ - - \longrightarrow$ betyder "är hälften så stort".

Skriv tal i ringarna. Tänk på vad pilarna betyder!



Hitta nu själv på en liknande uppgift. Rita ringar, pilar och skriv tal i ringarna. Skriv också vad olika pilar betyder. Använd gärna färgpennor eller krita när du ritat pilarna!

F

Hur lång är en långfilm? Ungefär två timmar säger du? Men hur många meter lång är filmen då? Hur skulle man kunna ta reda på det? Diskutera gärna med en kamrat och skriv ned så många olika förslag du kan komma på.

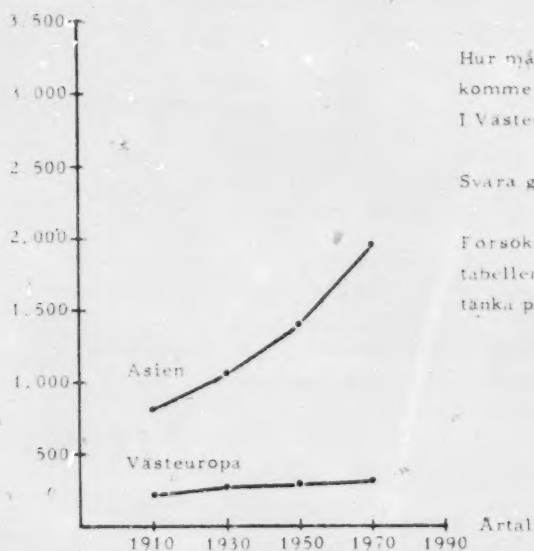
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Tabell över befolkningsutvecklingen i Asien och Västeuropa

Världsdelen	Årtal			
	1910	1930	1950	1970
Västeuropa	220	260	280	320
Asien	910	1050	1380	1980

Tabellen visar hur många människor det funnits i Asien och Västeuropa vid olika tidpunkter. Vi kan också visa tabellen genom att rita ett diagram.

Antal människor i miljoner



Hur många människor tror du det kommer att finnas i Asien 1990?
I Västeuropa?

Svara genom att rita i diagrammet.

Försök att hitta på några frågor, som tabellen och diagrammet får dig att tänka på.

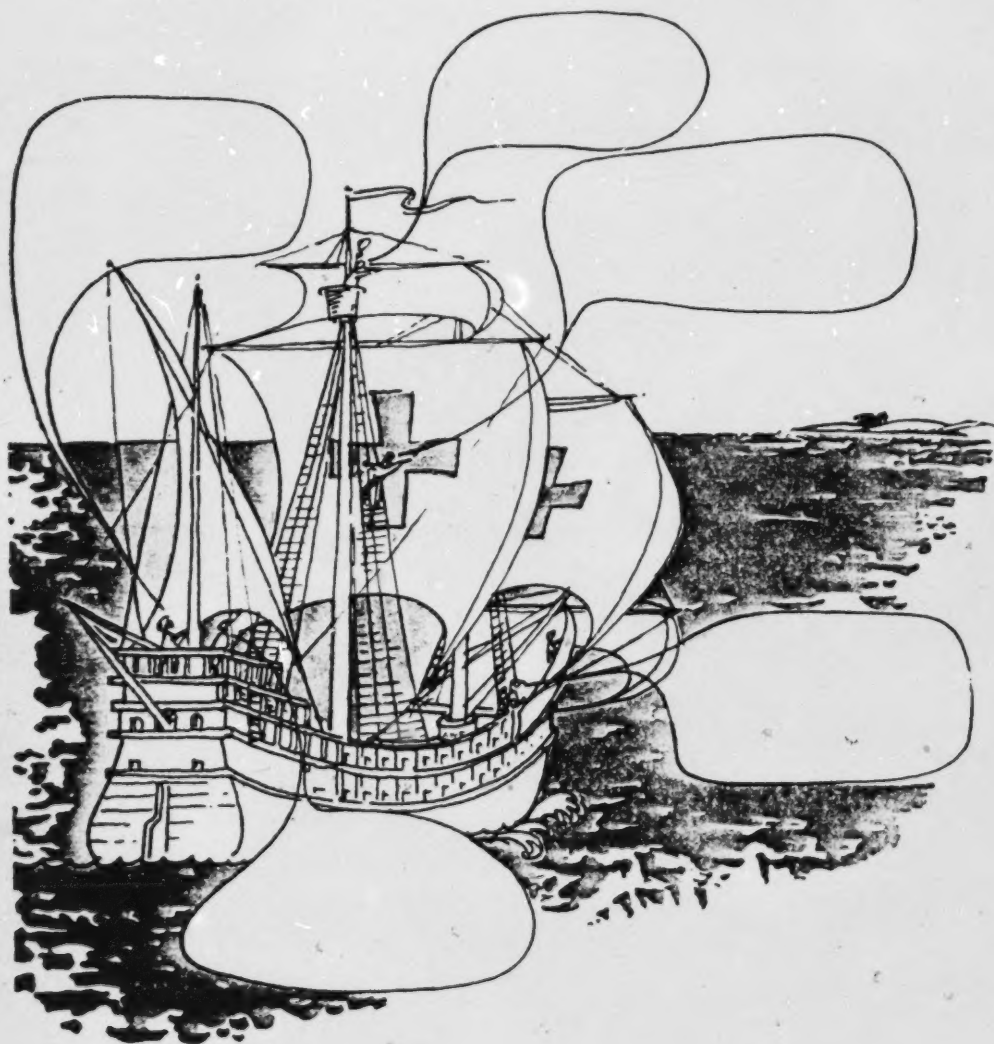
Frågor som jag kommer att tänka på:



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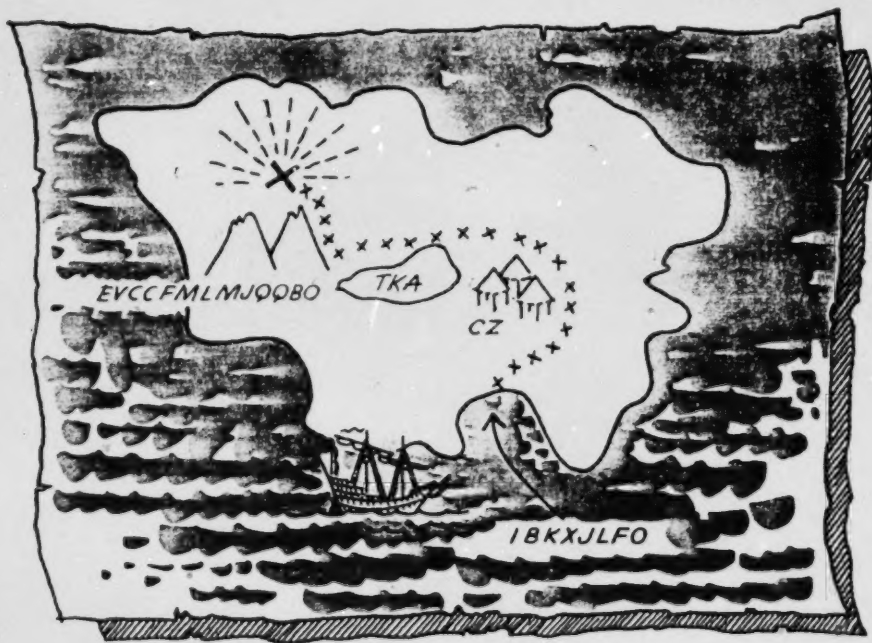
LAND I SIKTE

Efter flera veckor till sjöss får man antingen en dag syn på
några öar i fjärran.
Fyll i pratbubblorna vid du tror besättningsmännen och
Columbus sade!



J

Du är matros på ett av Magellans skep. En dag landstiger ni på ett ställe vid Sydafrikas kust. Ni träffar infödingar, som ni byter varor med. På kvällen kommer en av infödingarna till dig med en gulnad pappersbit. Du vecklar upp den - och upptäcker en skattkarta! Den måste vara gjord av någon som var med redan på Vasco da Gamas resa. Kartan är ganska otydlig och skriften konstig. Skatten är värdefull och du måste finna den! Lös chiffret så får du veta vad som göms i skatten!



CBLPN EVCCFMLMJQQBO MJHHFS TLFOQTLBTBBO
HSÖX FO NFUFS TÄ CMJS EV SJL



Du ser på kartan, att man måste åka färja mellan de flesta öarna i Danmark, eftersom där finns så få broar. Du är nu lastbilschaufför vid en fabrik i Småland. Varannan vecka kör du med varor till Paris, och varannan vecka till Esbjerg. Efter några månader är du trött på alla resor med färja, som tar lång tid. Tänk så bra, om du skulle kunna köra på broar hela tiden och slippa åka färja! Vilka två broar skulle du vilja bygga? Rita streck på kartan där du skulle vilja ha dem för att snabbare komma till Paris och Esbjerg. Förklara varför du vill ha broarna just där du dragit strecken.

Jag vill ha broar mellan _____ och _____

och mellan _____ och _____ därför att _____

Fortsatt på ett annat papper om du inte får plats!

L

En kväll har du parkerat din lastbil utanför ett motell i Gedser på Falster. Du sitter och talar med ett par danskar medan du äter. En av danskarna är styrman på en färja, och den andre arbetar på motellet. Du visar dem ditt förslag till nya broar, men de båda männen tycker inte alls om förslaget. De anser, att för dem skulle broarna medföra många nackdelar. Vilka nackdelar tror du de nämner för dig?

STYRMANNEN:

MOTELLARBETAREN:



Gör en pjäs, där chauffören, motellarbetaren och styrmannen sitter och pratar om för- och nackdelar med nya broar!

in the three major school subjects Swedish, mathematics and social science. It was decided to orient the material and the try-out study towards grade 5. The students were here considered to be sufficiently versed in reading and writing to be able to take part in an advanced testing program and at the same time probably still relatively open to influence as far as creativity is concerned.

As constructors of exercises six interested teachers were recruited: two for each of the three school subject areas. The exercises were constructed so that the content, selected from the curriculum for grade 5 (in each subject), was treated in a more creativity-stimulating way (utilizing a number of general lines of direction). The preliminary material was then discussed and edited in a larger group. Preliminary try-outs with small groups of students were included at selected points.

It is difficult to get a clear idea of the character of the final teaching material without studying it in its totality. (It has been published as the first seven issues in our series, "Pedagogiska hjälpmedel" (Educational aids); see reference list below under K-projektet, 1971.) In order to give the reader of this survey article some glimpses of what the exercises may look like, some sample pages have been extracted, reduced in size and reproduced here as figure pages A—L. Some comments are given in Box 2.

In the evaluative try-out with the materials twenty-four classes in grade 5 were used. The investigations consisted of: a battery of pre-tests at the start of the autumn term, a period of instruction including the exercises developed, and then a postinstruction test battery. Eight classes were used as control classes (with testing only), sixteen classes as experiment classes (with four variations: exercises in Swedish, in mathematics, in social science, and in all three subject areas). In composing the experiment and control groups, school districts with varying social structure were distributed in such a way as not to bias the results.

The test battery used in the evaluations comprised four main categories of instruments: creativity tests related to specific subjects, general creativity tests, tests of creativity-related behaviors and attitudes, and knowledge tests. Some new constructions had been developed and pre-tested for inclusion in this battery.

Marked effects of the educational materials could be observed in

Box 2. Some comments to figure pages A—L from the exercises for grade 5

Figure pages A—D are extracted from the exercises in "Swedish"; pages E—H are taken from the mathematics exercises; and pages I—L, finally, are reproduced from the booklets used in social science.

In general, purely reproductive tasks are almost non-existent, and convergent tasks (with only one correct answer) are infrequent. Normally the tasks demand that the students develop chains of thought, improve, change, find many different solutions, invent new combinations etc. — often in a playful and perhaps drastic way (see, for example, page C, D, H). — Not all tasks demand creative behavior, however; some just train general problem-solving with types of problem that students of this age usually find stimulating (for example, page J).

For readers who find the Swedish text puzzling we give a brief indication of the content of each figure page below.

- A: The student should first try to solve two rebuses, then construct two himself.
- B: This is a cross-word puzzle already solved. The task is to write possible descriptions to the filled-in words. Where there is more than one line, the student should write alternative descriptions.
- C: The student is instructed to suggest two names for each of three inventions (for example, in point c, a non-smearly sun protection oil that is also very good on hamburgers).
- D: "The power of silence". Have you ever wished that you could "turn off" a person who talks too much? Could one solve some problems that way? Or is there a risk that one would create new problems instead? — After such an introduction the student is instructed to think of and write down five things that might happen, if we had the ability to "turn off" people.
- E: The student should fill in numbers that "fit in" within the design, considering that the different types of arrow have specific defined meanings ("is twice as large" etc). Then he is to construct another task himself using a similar technique.
- F: The student should discuss with a classmate and write down various ways of finding out how long a movie film is, in metres.
- G: The student is presented with a table and a diagram showing data on population trends in Asia and Western Europe. He is asked to estimate figures for 1990 and then write down a number of questions that are inspired by the facts given.
- H: The pictures show a situation where a father asks his son to measure his room and the son returns happily reporting that the room is two tubes of caviar long and one tube wide. The student is requested to think of as many different ways of measuring a room as possible.
- I: Columbus and his crew finally see some distant islands. The student should fill in suggestions of what they say.
- J: The student (supposedly a crew member of one of Magellan's ships, landed on the coast of South Africa) should try to decipher some information probably related to a treasure.
- K: The student should take the role of a truck-driver carrying goods to Esbjerg and Paris, who is tired of the time-consuming ferries. Using a map, he should make suggestions as to where to build two bridges that would suit him, giving the reasons for his suggestions in writing.

Box 2. (cont.)

L: This is a follow-up to the task above. The truck-driver talks to a few Danes at a motel in Gedser, Falster. One of them is working at the motel, the other is chief mate on a ferry. The two Danes consider that the suggestions for bridges involve several drawbacks for them. The student has the task of imaging and writing out what they say, and then organizing a small play, where the truck-driver, the motel worker and the chief mate talk about advantages and disadvantages of new bridges.

all four experiment groups. In general, effects could be seen in all four measurement categories. The strongest effects were noted in the mathematics group and in the group that made creativity exercises in all three subject areas.

It was interesting to note, among other things, that the learning of basic knowledge had not been made more difficult through the emphasis on creativity exercises (something that many teachers had been afraid of), but that this knowledge learning was also improved. This result probably is a consequence of the fact that the students in the experiment groups worked with the knowledge items in a more active, incisive and many-sided way.

The general impression among the teachers and students involved was also positive. The exercises were generally experienced to be fun to work with, easy and stimulating (cf Björklund, 1974).

Additional topics and reports

Beside the major tasks of the project described above, the area of creativity was explored simultaneously in our department in several other ways, including attempts (a) to study some related concepts (including that of the intuitive synthesis) in older esthetic discussions (Bjerstedt, 1972 a), (b) to discuss the "control — creativity dilemma" in research and research training (Bjerstedt, 1972 b), as well as (c) to relate observable creative behavior in micro-drama situations to test measures of creativity (Ekstrand, 1974).

The major reports from the project as well as from some of these side-explorations are listed with abstracts or annotations at the end of this survey; and they can all be requested free of charge from our department, as long as our supply lasts.

Final considerations

A major part of the school activities can be seen as aiming to build up preparedness for the future in a more general sense. The knowledge, the skills and the behavioral tendencies that are added to a student's repertoire during school time can obviously be seen as important working tools in his future activities in working situations or, in general, as a member of the society.

However, there are many reasons for thinking that the school should, more systematically than at present, work towards creating an adequate preparedness for the future, both through "future orientation" and through a more conscious attempt to focus on such general skills that have a more definite character of preparedness for the future. A more marked focusing of skills and behavioral tendencies of future-oriented character might, for example, involve attempts to create a higher degree of "future consciousness", a greater preparedness and ability to meet new problem situations in a flexible and creative way, and an increased feeling of responsibility for the effects, in a longtime perspective, of various societal decisions and non-decisions (cf Bjerstedt, 1976 a, b).

It is possible to motivate in different ways that we should work for a more thoroughly creative school. Some guide-lines for such a future school were sketched some years ago by one of the project members (Hansson, 1974 b).

However, much can be achieved even with fairly limited means, for example, in the area of educational materials. One of the main findings of the project was obviously that it is possible, with fairly simple means, to promote important parts of the aims of the school that are otherwise easily left underdeveloped. The kind of exercises that were developed and used represent a type of educational activities that can easily be introduced into the regular teaching.

Hence, there seem to be good reasons to undertake practical measures so that the type of exercises that were tried out in the project, could be used more extensively — as a first step towards a more creative school. For this we need continued developmental work, oriented towards some of the central school subjects on different school levels. A natural hope is that such continued developmental work will take place in the near future among interested parties.

Reports: Abstracts or Annotations

- Bjerstedt, A. Den intuitiva syntesen: Ett grundbegrepp i Hans Larssons litteraturpsykologi av potentiellt intresse för kreativitetsforskningen. /The intuitive synthesis: A basic concept in Hans Larsson's esthetics that is of potential interest to creativity research./ *Pedagogisk-psykologiska problem*, No. 167, 1972. (a) — During the 1890s the Swedish philosopher and writer, Hans Larsson, explored in books and essays the problems of the fine arts. In the present report one of the central concepts in his literary criticism and theoretical works, the intuitive synthesis, is discussed and illuminated by means of text analyses. In the first section some general psychological characteristics of the intuitive synthesis are outlined; in the second, various applications to esthetic problems are illustrated; in the third, some background factors are treated. Several of his observations seem relevant to modern creativity research.
- Bjerstedt, A. (Ed.) *Kreativitet och kontroll*. /Creativity and control./ (Pedagogisk orientering och debatt, No. 38.) Malmö: School of Education, 1972. (b) — Do we at present over-emphasize control and under-emphasize creativity in research and research training? How can we promote creativity, and how can we reach an adequate balance between creativity and control? These were some of the starting questions for a course (within the research training program in education) entitled "Creativity and control in the scientific process". This topic was dealt with by invited research workers representing different areas and it was treated from various points of view in individual essays and some empirical mini-studies. In this book, glimpses from the courses are given by means of selected lectures, discussions, and course papers.
- Bjerstedt, A. Framtidsberedskap, jämställdhet och kreativitet som utbildningsmål. /Preparedness for the future, equality, and creativity as educational goals./ *Compendium Series* (Malmö: School of Education), No. 17, 1976. (a) — This report discusses research needs within the broad area of preparedness for the future. Equality attitudes and creativity are regarded as important aspects of such a preparedness. The discussion is related to some finished, ongoing, and planned research at the Malmö School of Education.
- Bjerstedt, A. Kooperation, Unabhängigkeit, psychische Beweglichkeit: Einige Aspekte der Vorbereitung für die Zukunft. /Cooperation, independence, mental agility: Some aspects of preparedness for the future./ *Didaktometrie und Soziometrie*, No. 16, 1976. (b) — Most people agree that schools should do more to equip students for the future than simply to present them with a given mass of knowledge. For example, the students should be trained to cooperate productively, to adopt their own standpoints with critical independence and to develop a mental agility that will enable them to meet new problems creatively. Rather little is known of how these goals can best be realized, and our possibilities of objectively measuring how far these objectives are reached are limited. A series of research studies in Malmö have dealt with this problem area, and a number of abstracts on reports published are presented (in German).

- Björklund, S. Att befrämja kreativitet i skolan: Några elev- och lärarsynpunkter på en uppsättning övningsmaterial i svenska, matematik och orienteringsämnen. /Encouraging creativity in school: Some student and teacher opinions on a battery of exercises in Swedish, mathematics and social science./ *Pedagogiska hjälpmedel*, No. 12, 1974. — In order to study the possibilities of promoting creativity in school, special series of exercises in three school subjects have been constructed (*Pedagogiska hjälpmedel*, No. 1—7). The effects of the exercises have been examined with comprehensive test batteries (*Pedagogisk-psykologiska problem*, No. 243). In the present report the attitudes of students and teachers toward the exercises are explored.
- Ekstrand, G. Dramatisk framställning och mått på kreativitet: En explorativ studie. /Behavior in micro-drama situations and measures of creativity: An exploratory study./ *Pedagogisk-psykologiska problem*, No. 258, 1974. — Attempts have been made to relate observable creative behavior in micro-drama situations to a number of test measures of creativity. Teacher students have been rated by three raters in drama situations and have been given five creativity tests and one personality instrument. Correlations between ratings and tests were mostly low but positive. A tendency to higher correlations was shown when original and "irrelevant" test responses were utilized separately. Subjects with high ratings tended to have individualistic traits according to the personality instrument.
- Eriksson, A. Lärarenkäter om kreativitet i skolan. /Teacher opinions on creativity in school./ *Pedagogisk-psykologiska problem*, No. 118, 1970. — Results from three questionnaire studies on creativity are reported. The purpose of the questionnaire studies, partially based on each other, has been to gather the opinions of teachers about the importance of developing and stimulating the creative ability of the students in school, as well as about the actual possibilities of doing this. Questions of the following type are touched upon: How can the teacher develop the creative ability of his students? What kinds of working method and educational procedure are most effective in encouraging creativity?
- Eriksson, A. Potentiellt kreativitetsbefrämjande undervisningsbeteenden: Bakgrundsdiskussion och undersökningsprocedur. /Teaching behaviors that potentially encourage creativity: Background discussion and research procedure./ *Pedagogisk-psykologiska problem*, No. 202, 1972. (a) — This report discusses on a theoretical basis which behavioral categories may be assumed to be of critical importance for creative teaching. An observation and ratings schedule has been constructed. The different categories of the schedule are presented and discussed. — A study has been carried out involving a number of classes in grades 4—6 of the comprehensive school. The present report presents the problems, the general plan, and the measuring instruments used for students and teachers.
- Eriksson, A. Klassrumsobservationer med inriktning på potentiellt kreativitetsbefrämjande undervisningsbeteenden: Metod- och sambandsstudier på mellanstadiet. /Classroom observations with a focus upon teaching behaviors that

- potentially encourage creativity: Studies of methods and relationship in grades 4—6 of the comprehensive school./ *Pedagogisk-psykologiska problem*, No. 206, 1972. (b) — This report presents the results of an observation and rating study conducted in a number of classes in grades 4—6 of the comprehensive school. (Cf background data in report No. 202 above.) An account is given firstly, of analyses of the reliability of the observation and rating schedule, using various assessment techniques and secondly, of factor analytical data. With the aid of test data and questionnaire data, certain relationships between the teacher's teaching strategies and the creative level of the students are studied. In addition, some test data on creativity and "conventional" intelligence are presented.
- Eriksson, A. Ett observations- och skattningsschema med inriktning på potentiellt kreativtetsbefrämjande undervisningsbeteenden. /A schedule for observing and rating teaching behaviors that potentially encourage creativity./ *Testkonstruktion och testdata*, No. 20, 1973. (a) — This manual describes a schedule for observing and rating teaching behaviors hypothetically related to student creativity. Definitions and examples of observation categories used, techniques of registration, and instructions for data treatment are presented. In addition, some Swedish data on distributions, reliabilities and validities are included.
- Eriksson, A. Parallella linjer — ett figuralt kreativitetstest. /Parallel lines — a figural creativity test./ *Testkonstruktion och testdata*, No. 22, 1973. (b) — Some Swedish test data on a figural creativity test, Parallell linjer (from E. P. Torrance's test battery), are presented, including distribution data and some information on reliability and validity. In addition, instructions for administration and for evaluation of responses from Swedish children are given.
- Hansson, G. Manual för sju verbala kreativitetstest. /Manual for seven verbal creativity tests./ *Testkonstruktion och testdata*, No. 23, 1973. (a) — The Torrance Tests of Creative Thinking are widely used for English-speaking school children. They have also been used in a translated research version in Sweden in studies performed within the Creativity Project at the Malmö School of Education. Test data of a technical kind from these studies are reported here together with translated excerpts from the original manual for the seven verbal tests of form B of the Torrance battery. Special problems in the evaluation of creativity test answers are discussed in some detail.
- Hansson, G. Mätning av kreativitet hos skolbarn. /Measuring creativity in school children./ *Pedagogisk-psykologiska problem*, No. 220, 1973. (b) — A number of creativity tests, including several from Torrance's verbal and figural battery and some new constructions, are examined from the point of view of evaluation. The development of creativity between grades 4, 6 and 8 is studied, whereby sex differences are paid particular attention. Differences between students with high and low creativity scores are investigated with respect to personality variables, partly with reference to Cattell's creativity equation for HSPQ and to Sjöbring's personality theories. Relationship between test creativity and independence according to teacher and peer assessments and according to "conformity" tests in the form of questionnaires are explored.

The concept of "flexibility" is paid particular attention, and some new tests are designed to study this aspect.

Hansson, G. Att befrämja kreativitet i skolan: Konstruktion och utvärdering av särskilda övningsmaterial i svenska, matematik och orienteringsämnen. /Encouraging creativity in school: Construction and evaluation of training materials in three school subjects: Swedish, mathematics and social studies./ *Pedagogisk-psykologiska problem*, No. 243, 1974. (a) — One of the goals of the Malmö School of Education's project "Creativity at school" was to construct and test examples of exercises related to school subjects and aiming at promoting creativity. The present report gives an account of the project's investigations related to this goal. — Special exercises were written in three school subjects: Swedish, mathematics and social science with material from the intermediate stage of the comprehensive school. The study was designed as a learning experiment with pre-tests and post-tests. Twenty-four class units participated, eight as control groups (with testing only) and the rest as experiment groups (with four variations: exercises in Swedish, in mathematics, in social science and in all three subject areas). The test battery used in the evaluation comprised four main categories of instruments: creativity tests in specific subjects, general creativity tests, tests of creativity-related behaviors and attitudes and knowledge tests. Marked effects could be noted in all three subject groups. In general effects could be seen in all four measurement categories.

Hansson, G. Kreativitet i skolan: En projektöversikt. /Creativity in school: A project survey./ *Pedagogisk dokumentation*, No. 33, 1974. (b) — A research project with creativity in school is summarized. Among the interest areas included have been: development and try-out of certain Swedish tests for creativity; studies of relations between these tests and various personality variables; surveys of opinions about how to promote creativity in schools; classroom observations on creativity-relevant teacher-student interactions; and attempts to construct and evaluate potentially creativity-promoting study materials, integrated in the regular school work. After summaries of the main investigations, some more general conclusions and recommendations for future developments are sketched.

K-projektet, LHM. Övningsmaterial i svenska: "Lek på allvar med ord, Häfte I—II". /Creativity project, Malmö School of Education, MSE. Exercises in Swedish: "Play with words, Book I—II"./ *Pedagogiska hjälpmedel*, Nos. 1—2, 1971. — Is it possible to work out creativity-promoting exercises closely related to and integrated with the regular instruction according to the school plans? If so, how are such exercises experienced by students and teachers? Can measurable effects be observed using objective tests? Potentially creativity-promoting exercises were worked out for use in three major school subjects: Swedish, mathematics and social science in the middle stage of the comprehensive school. The present volumes contain the material developed as exercises in Swedish.

K-projektet, LHM. Övningsmaterial i matematik. /Creativity project, MSE.

Exercises in mathematics./ *Pedagogiska hjälpmedel*, No. 3, 1971. — This volume contains material developed as exercises in mathematics within the sub-study described above concerning effects on creativity indicators of special training materials.

K-projektet, LHM. Övningsmaterial i orienteringsämnen. /Creativity project, MSE. Exercises in social science./ *Pedagogiska hjälpmedel*, Nos. 4—7, 1971. — These four booklets contain material developed as exercises in social science within the sub-study described above concerning effects on creativity indicators of special training materials.

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